Supplementary Information

Photocatalytic H_2 production on tritatanate nanotubes coupled with CdS and platinum nanoparticles under visible light: *Revisiting H_2 production and material durability*

Hyunwoong Park,[1,2,*] Hsin-Hung Ou,[3] Minju Kim,[1,2] Unseock Kang,[1,2]
Dong Suk Han,[4] and Michael R. Hoffmann[3,*]

[1]School of Energy Engineering and [2]School of Architectural, Civil, Environmental, and Energy Engineering, Kyungpook National University, Daegu 41566, Korea
[3]Linde-Robinson Laboratories, California Institute of Technology, Pasadena, California 91125, United States of America
[4]Chemical Engineering Program, Texas A&M University at Qatar, Education City, P.O. Box 23874, Doha, Qatar

*To whom correspondence should be addressed.
(HP) Tel: +82-53-950-8973; E-mail: hwp@knu.ac.kr
(MRH) Tel: +1-626-395-4391; E-mail: mrh@caltech.edu

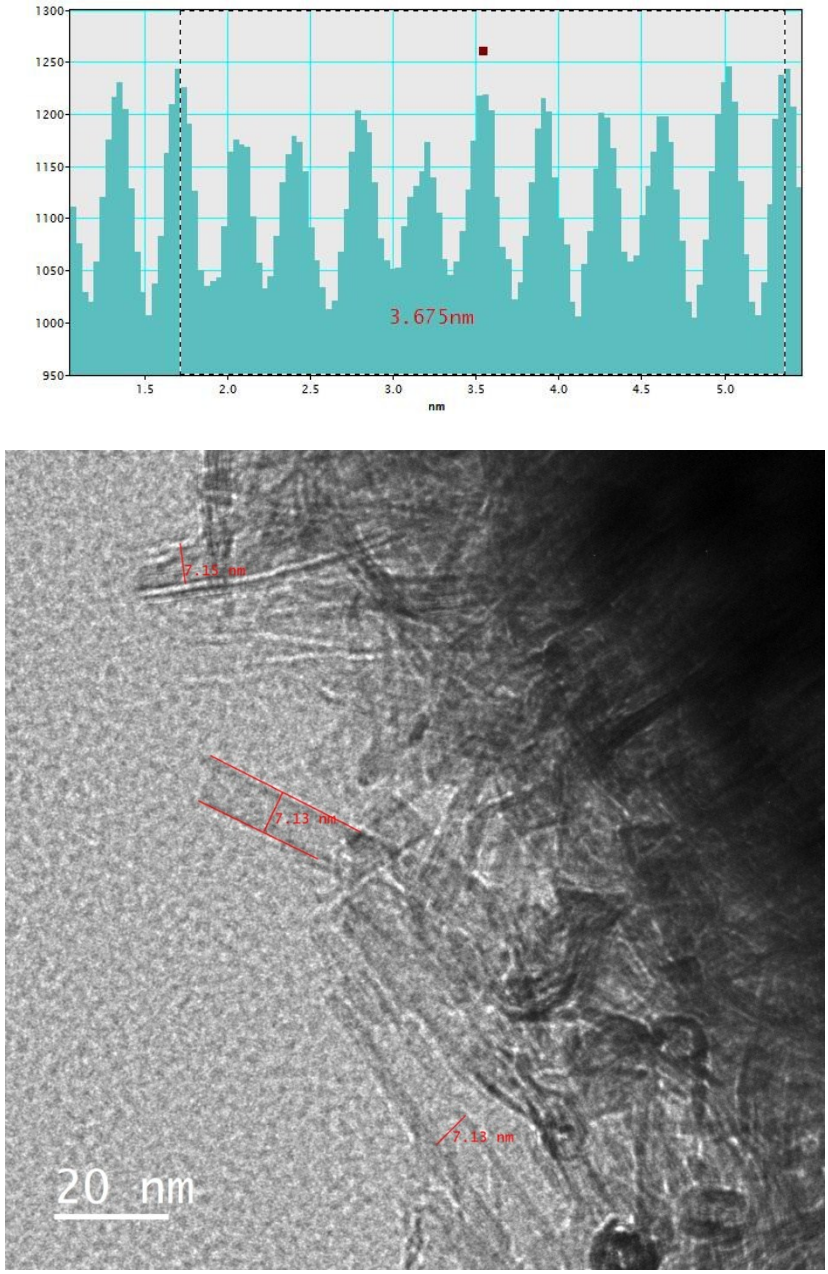

Fig. S1. Lattice spacings and TEM image of TNTs.

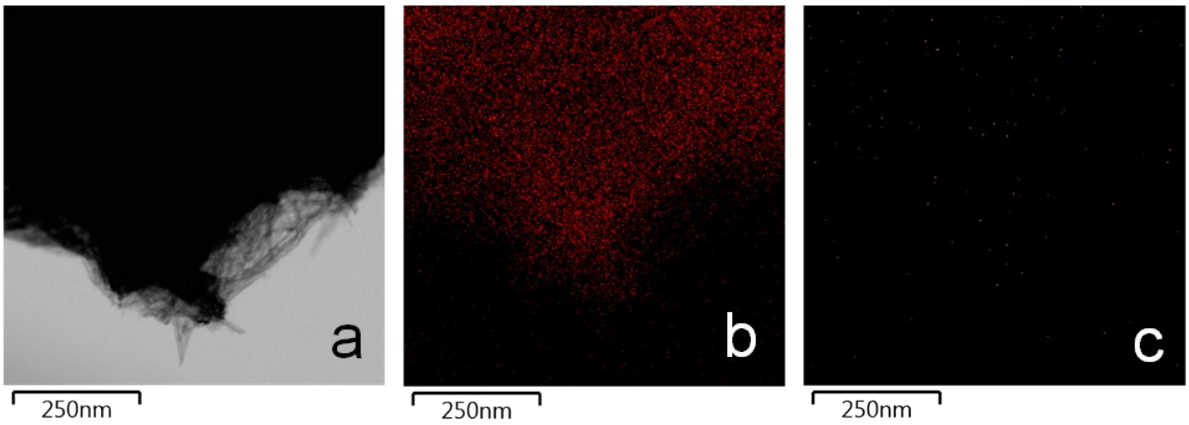

Fig. S2. (a) Electron image and (b and c) EDS analysis of Pt/CdS/TNTs sample. O and S were shown in b and c, respectively.

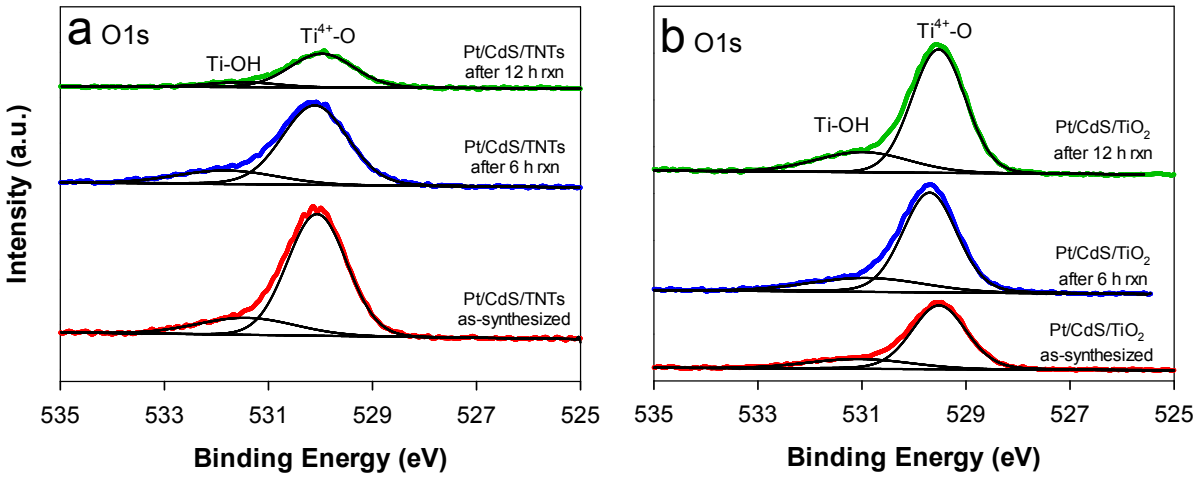

Fig. S3. XPS analyses of O1s for (a) Pt-2/CdS/TNTs and (b) Pt-0.5/CdS/TiO_2 before and after photocatalytic H_2 productions for 6 and 12 h.

Two major contributors to the O1s spectra were found: a major fraction of crystal lattice oxygen at 530 eV and a small fraction of surface-adsorbed hydroxyl groups (>Ti-OH) at 532 eV.[2,3] The surface hydroxyl groups are known to be a source of reactive oxygen species.[3,4] Obviously the fraction of >Ti-OH on Pt/CdS/TiO_2 increased with reaction time, whereas its fraction on Pt/CdS/TNTs decreased with time.

1 S. Y. Ryu, W. Balcerski, T. K. Lee and M. R. Hoffmann, *J. Phys. Chem. C*, 2007, **111**, 18195-18203.

2 H.-H. Ou, C.-H. Lia, Y.-H. Liou, J.-H. Hong and S.-L. Lo, *Environ. Sci. Technol.*, 2008, **42**, 4507-4512.

3 H.-H. Ou and S.-L. Lo, *J. Mol. Catal., A*, 2007, **275**, 200-205.

4 S. H. Szczepankiewicz, J. A. Moss and M. R. Hoffmann, *J. Phys. Chem. B*, 2002, **106**, 2922-2927.